



SERVICE BULLETIN

KODAK X-OMAT Processor

Eastman Kodak Company/Customer & Technical Services/Health Sciences Markets Division/Rochester, New York 14650

February 1992

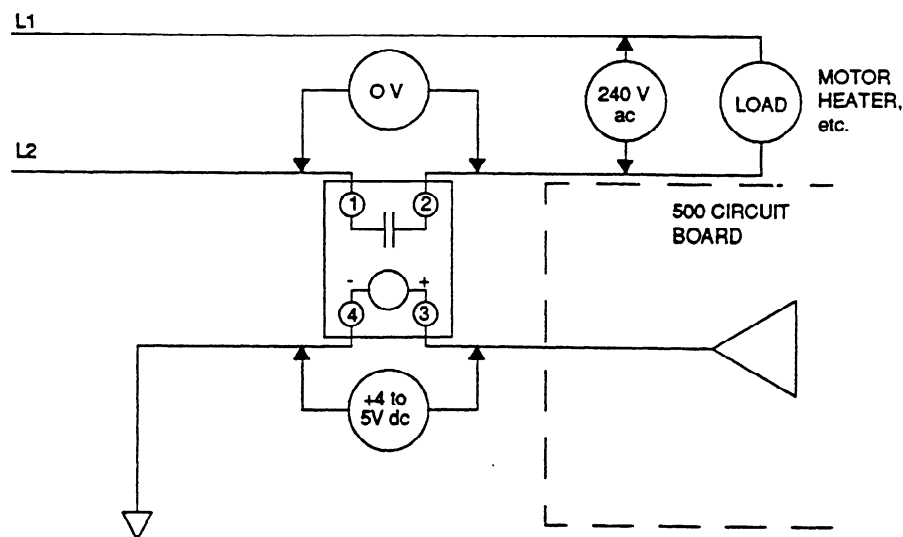
SERVICE BULLETIN NO. 135

All Kodak X-Omat Processors

Troubleshooting Solid State Relay Problems

It has come to the attention of Service and Manufacturing Engineering that problems have been encountered troubleshooting Solid State Relays in RA Processors. To provide a tool to better identify problems with these devices, the following information is being published.

The illustration below represents Solid State Relays, used in RA Processors, in normal operation. Source Voltage is stated as 240 V ac.



Energized Relay

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The DC (Control) side of the relay is electrically connected between the 500 Circuit Board and ground. When the Load is to be energized, the 500 Circuit Board supplies +4 to +5 V dc (Control Voltage) to Connector 3. When Control Voltage is present, the AC Section conducts AC current and supplies power to the Load. When Control Voltage is removed, the AC Section ceases conducting AC current and removes power from the Load. This is normal operation for Solid State Relays in RA Processors.

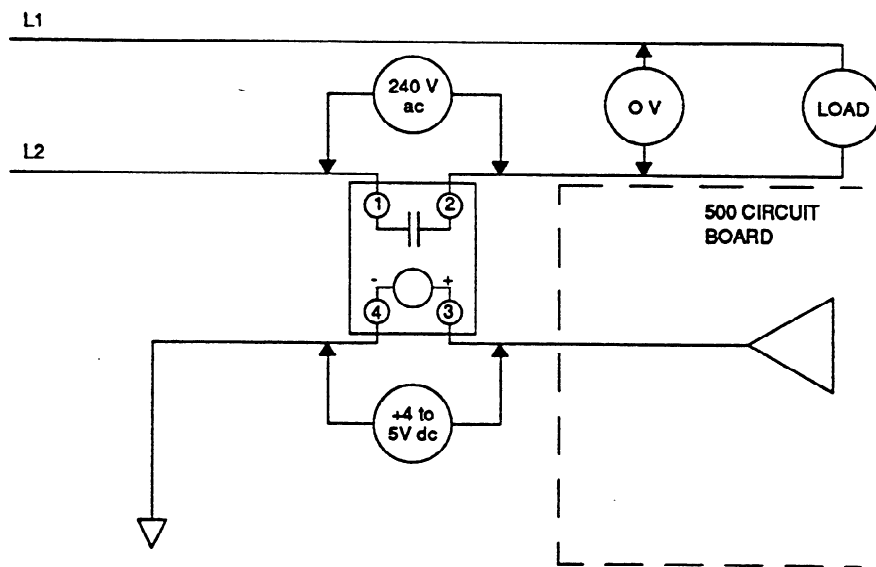
Possible faults that can occur in a Solid State Relay:

- (1) AC Section Open
- (2) AC Section Shorted
- (3) AC Section Half-Wave Short
- (4) AC Section Half-Wave Open

Fault Indicators for Solid State Relay Problems In RA Processors

[1] AC Section Open - The Load (Motor, Heater, etc.) cannot be energized. Observable indications:

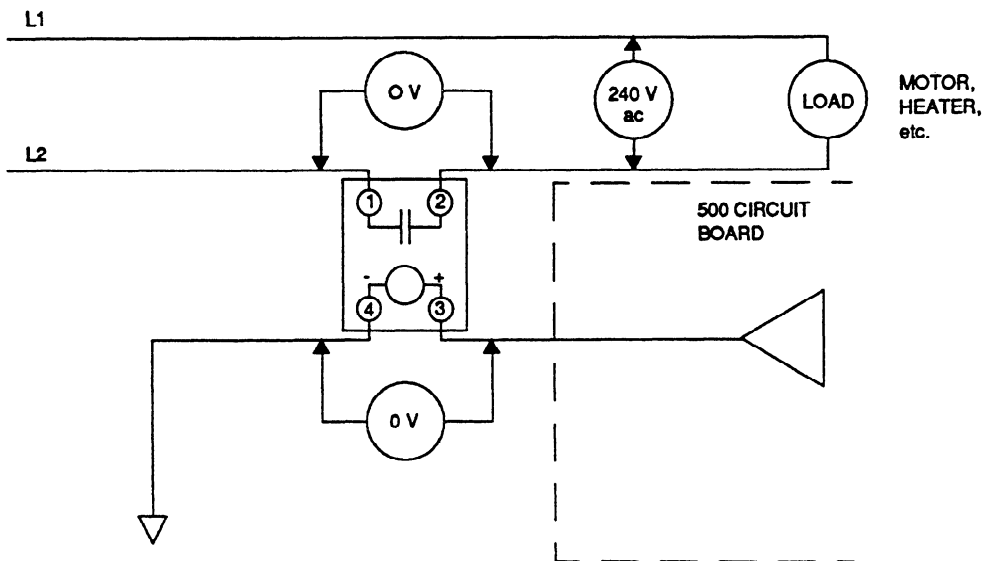
- No Dryer Heat
- No Developer or Fix Heat
- Developer or Fix Replenish Pumps Inoperative



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[2] AC Section Shorted - The Load cannot be deenergized. Observable indications:

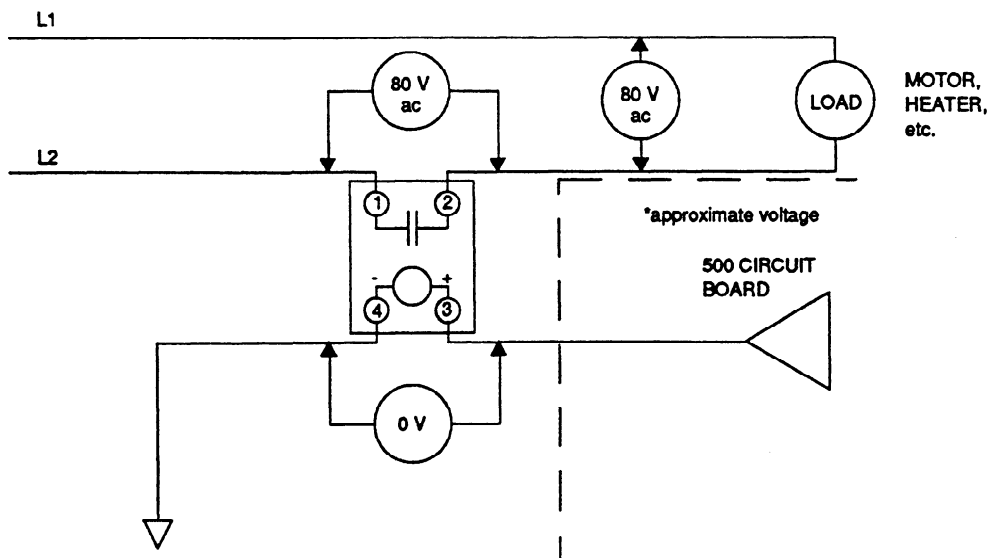
- Dryer Over-Temperature
- Developer or Fix Over-Set Temperature
- Developer or Fix Replenish Pumps Continually Operates



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[3] AC Section Half-Wave Short - A portion of the Source Voltage is continually applied across the Load in the form of pulsating DC. When Control Voltage is applied, full Source Voltage (AC) is applied across the Load. Observable indications:

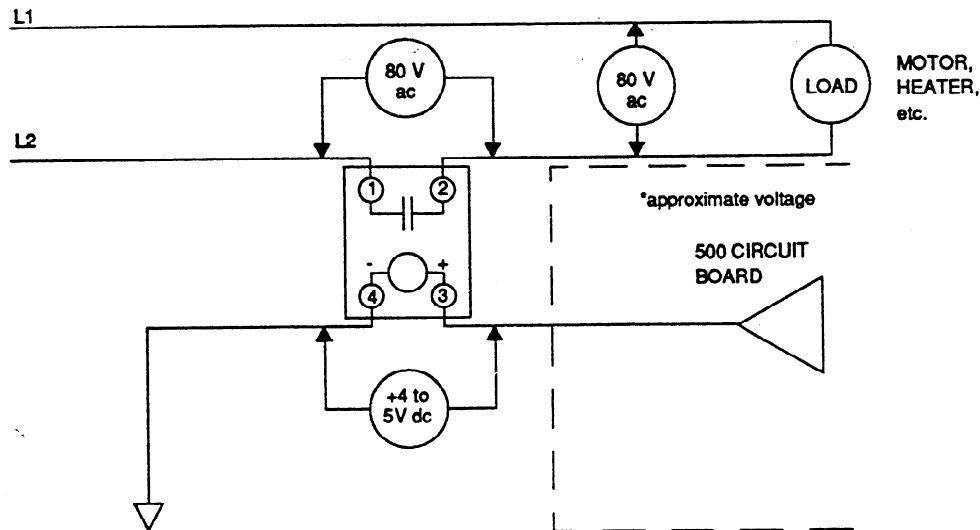
- Dryer Over-Temperature
- Developer or Fix Over-Temperature
- Developer or Fix Replenish Pump humming, overheating, or rotating slowly/intermittently during non-replenish times.



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[4] AC Section Half-Wave Open - When Control Voltage is applied, only a portion of Source Voltage will be applied across the Load in the form of pulsating DC. Observable conditions:

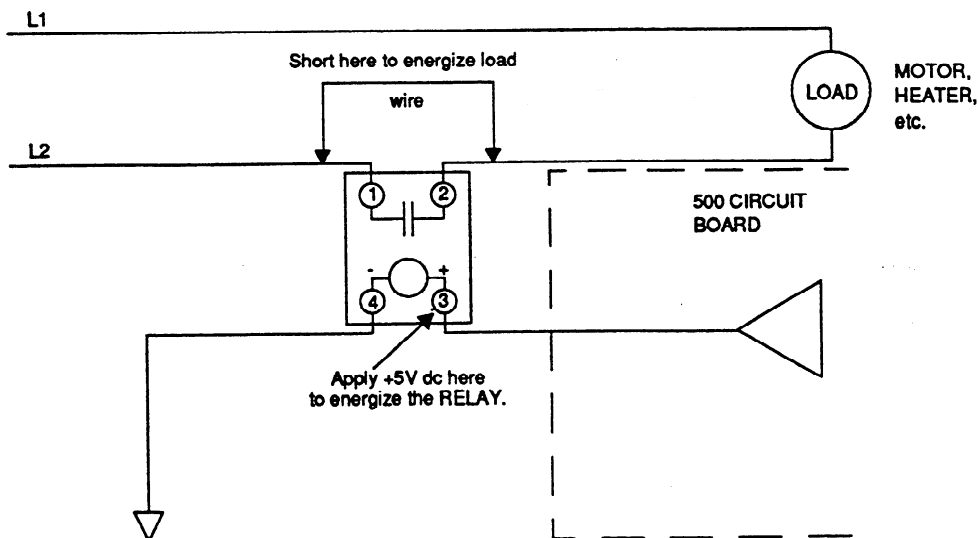
- Dryer Unable to Reach Operating Temperature
- Developer or Fix Under-Temperature
- Developer or Fix Replenish Pumps Unable to Operate



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Before replacing any parts, the below tests should be conducted to verify the location of the problem. Three possibilities exist:

- (1) Control Voltage is being supplied. The Solid State Relay is reacting but the Load is still inoperative. **Result:** The Load (Motor, Heater, etc.) is the faulty component.
- (2) Control Voltage is being supplied but the Solid State Relay is not conducting. **Result:** The Solid State Relay is the faulty component.
- (3) The 500 Circuit Board is not supply Control Voltage at the appropriate time. **Result:** The 500 Circuit Board is the faulty component.



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TEST 1

- (1) Deenergize the processor.
- (2) Place a Clip Lead from Terminal 1 to Terminal 2 on the Solid State Relay.
- (3) Energize the processor.

NOTE

Solution Tanks must be full and/or air flow present to check Heater operation.

- (4) Did the Load operate? Yes - Load is good. No - Replace Load.
- (5) Deenergize the processor.
- (6) Remove the Clip Lead from Terminals 1 and 2.

TEST 2

- (1) Remove wire from the 500 Circuit Board to Terminal 3 of the suspect Solid State Relay.
- (2) Place a Clip Lead from +5 V dc on the Quad Power Supply to Terminal 3 of the suspect Solid State Relay.
- (3) Energize the processor.
- (4) Did the Load operate? Yes - Solid State Relay is good and the 500 Circuit Board is suspect. No - Replace the Solid State Relay.
- (5) Deenergize the processor.
- (6) Remove Clip Lead from Step 2.

For more information, please contact:

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Health Sciences Division

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